Remarks

Entry of the amendments, reconsideration of the application, as amended, and allowance of all pending claims are respectfully requested. Claims 1, 3, 10-22 and 49 remain pending.

Applicants have amended claims 1 and 49 and canceled claims 4, 6-7, 9, 23-33, 36-47, and 50-51, without prejudice, from further consideration at this time. Applicants are NOT conceding that the subject matter encompassed by those claims are not patentable over the art cited by the Examiner. Claims 4, 6-7, 9, 23-33, 36-47, and 50-51 were canceled in this amendment solely to facilitate expeditious prosecution of the remaining claims. Applicants respectfully reserve the right to pursue claims, including the subject matter encompassed by claims 4, 6-7, 9, 23-33, 36-47, and 50-51, as presented prior to this amendment, and additional claims in one or more continuing applications.

Support for the amendments can be found in applicants' specification. For example, support for dependently sequenced can be found on page 9, lines 23-27 and page 10, lines 1-5; support for instance and the description thereof can be found on page 9, lines 1-7; support for the description of containment-based and chained locking can be found on page 10, lines 8-13; and support for the description of reference-based and referenced-based locking strategy can be found on page 11, lines 4-5 and 23-26. Therefore, no new matter has been added.
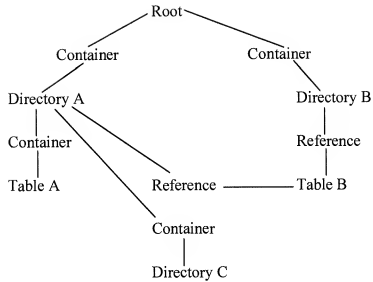
Again, the above amendments are being provided solely to facilitate expeditious prosecution of the remaining claims. Applicants respectfully submit that the amendments are not in acquiescence to any of the rejections provided in the final Office Action, dated October 18, 2007. Applicants are making a bona fide attempt to further prosecution of this application, and **applicants respectfully request that the Examiner contact applicants' attorney at the below listed number should the Examiner still have questions regarding the patentability of the remaining claims.**

In the Office Action, dated October 18, 2007, claims 1, 4, 7, 21, 47 and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldstein et al. (U.S. Patent No.

4,698,752) in view of Furlani et al. (U.S. Patent No. 5, 995,998); claims 3, 6, 9, 10, 22, 23 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldstein in view of Furlani and further in view of Soltis et al. (U.S. Patent No. 6,493,804); claims 11-14, 24-27 and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldstein in view of Furlani, in view of Soltis and further in view of Shaughnessy (U.S. Patent No. 5,555,388); claims 15-20, 28-33 and 41-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldstein in view of Furlani in view of Soltis and further in view of Annevelink (U.S. Patent No. 5,448,727). Applicants respectfully, but most strenuously, traverse these rejections to any extent deemed applicable to the amended claims.

In one aspect, applicants' invention is directed to the efficient locking of resources of a global data repository. A locking facility is provided that enables concurrent access to a complex data structure, while minimizing the lock acquisition necessary to access a particular resource of that complex data structure. As one example, the complex data structure is a data repository that includes a plurality of resources (e.g., tables, directories). The repository has a hierarchical topology and includes, in one example, resources that are dependently sequenced, in that one resource, such as Resource X, is accessed through another resource, such as Resource Y. There are also various relationships among the resources of the repository and the locks of the repository. As examples, the relationships of the resources include containment-based relationships and reference-based relationships. A containment-based relationship is a relationship in which there is exactly one reference from instances of a resource, such as Resource X, to an instance of another resource, such as Resource Y. On the other hand, a reference-based relationship is one in which there may be more than one reference from instances of a resource, such as Resource X, to an instance of another resource, such as Resource Y.

For example, as shown in FIG. 4, reproduced below, there is one reference from a directory, Directory A, to Table A, and therefore, the relationship is containment-based. However, there are multiple references from directories, Directory A and Directory B, to Table B, thus, there is a referenced-based relationship.

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                        Root
           Container              Container
        Directory A                  Directory B
        Container                    Reference
        Table A        Reference ———— Table B
                       Container
                       Directory C
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The type of locking relationship that exists depends on the particular relationship between the resources. For example, if the relationship between the resources is a containment-based relationship, then the locking acquisition is referred to a chained locking. On the other hand, if the relationship is a reference-based relationship, then the locking acquisition is referred to as a reference-based locking strategy. To minimize the locking needed, the locking strategy selected for a particular resource depends on the relationship between the resource and at least one other resource. This is explicitly claimed by applicants.

For example, in independent claim 1, applicants recite a method of managing the locking of resources of a data repository in which the method includes, for instance, having a data repository including a hierarchical structure of a plurality of dependently sequenced resources, the hierarchical structure including one or more resources having a reference-based relationship and one or more resources having a containment-based relationship; determining whether a relationship between one resource and another resource of the data repository is a containment-based relationship or whether the relationship is a reference-based relationship, wherein the relationship between the one resource and the another resource is a containment-based relationship if the one resource is accessed through the another resource and if there is only one reference from instances of the one resource to the another resource, and the relationship between the one resource and the another resource is a

reference-based relationship if the one resource is accessed through the another resource and if there are more than one reference from instances of the one resource to the another resource; locking at least one resource of the one resource and the another resource using a chained locking strategy, in response to the determining indicating the relationship is a containment-based relationship; and locking at least one resource of the one resource and the another resource using a reference-based locking strategy, in response to the determining indicating the relationship is a reference-based relationship, wherein a chained locking strategy is a different locking strategy than a reference-based locking strategy.

Thus, in one aspect of applicants' claimed invention, a determination is made as to whether the relationship between one resource and another resource is a containment-based relationship or a reference-based relationship. That is, a determination is made as to whether there is only one reference from instances of the one resource to the another resource, or whether there may be multiple references from instances of the one resource to the another resource. If the determining indicates that the relationship is a containment-based relationship, at least one of the resources is locked using a chained locking strategy. Further, if the determining indicates that the relationship is a reference-based relationship, at least one of the resources is locked using a reference-based locking strategy. This is not described, taught or suggested in Goldstein or Furlani, either alone or in combination.

While Goldstein describes database locking, there is no description, teaching or suggestion in Goldstein of determining whether the relationship between one resource and another resource is a containment-based relationship or a reference-based relationship, and then performing locking depending on that type of relationship. In particular, there is no description, teaching or suggestion in Goldstein of determining whether the relationship between one resource and another resource is containment-based in that there is only one reference from instances of the one resource to the another resource, and then locking at least one of the resources using a chained locking strategy, if the determining indicates the relationship is a containment-based relationship. Moreover, there is no determination of whether the relationship is a referenced-based relationship in that there may be more than one reference from instances of the one resource to the another resource, and then locking at least one of the resources using a reference-based locking strategy, if the determining indicates

that the relationship is a reference-based relationship. Due to this deficiency of Goldstein, Furlani is relied upon. However, Furlani does not overcome the deficiencies of Goldstein, either alone or in combination.

Furlani describes multiple groups of objects and associated locks. The objects of one group are non-interrelated with the objects of another group. A first group of objects can be locked by a first group lock and a second group of objects can be locked by a second group lock. A reference lock object can then be used to lock the links that interrelate the group locks, and further, the reference lock may be used to change the relationship between objects and/or groups. While the term reference lock is used, the reference lock and relationships in Furlani are very different than those claimed by applicants.

For instance, applicants describe that a reference-based relationship is a relationship in which there may be more than one reference from instances of a resource to another resource. As an example, if Table B is referenced by Directory A and Directory B (i.e., two instances of the directory resource), a referenced-based relationship exists. Applicants further claim determining if this relationship exists, and using a reference-based locking strategy, if it does exist. This is not described, taught or suggested in Furlani. Instead, in Furlani, a reference lock is used to change relationships between objects or to interrelate group locks. There is no discussion in Furlani of whether an object is referenced by another object one or more times, or of applicants' determining step or of their claimed locking strategy. These are missing from Furlani.

In the Office Action, it is indicated that Furlani teaches one or more of these aspects of applicants' claimed invention in FIGs. 2C and 3. However, applicants respectfully submit that those figures and associated text do not describe applicants' claimed reference-based relationship, but instead describes a very different structure and process. Furlani describes in FIGs. 2C and 3, the merging of two groups of objects to generate a third object. In particular, the groups of objects are merged by multiplying the first result image object with the second result image object to obtain the third object (see, e.g., col. 6, lines 34-50). In order to do this merging, the first group lock and a reference lock are obtained. However, this is very different from applicants' claimed invention in which a reference-based relationship is

defined as one in which there may be more than one reference from instances of a resource to another resource. There is no discussion of this type of relationship in Furlani, and further, there is no discussion in Furlani of determining that relationship and using a reference-based locking strategy if that relationship exists. Therefore, Furlani does not teach or suggest one or more aspects of applicants' claimed invention.

The same is true for a containment-based relationship. In the Office Action, it is indicated that the containment-based relationship is indicated in FIG. 2A of Furlani. However, applicants respectfully submit that FIG. 2A shows two groups of objects, a first group in which Object A and Object B are combined to create Object C; and a second group in which various objects (e.g., Objects D, E and F) can all use a look-up table object (LUT). There is no discussion in this cited section of Furlani of a relationship in which there can be only a single reference from instances of one resource to another resource, nor is there a discussion concerning the number of references to a resource. Furlani does not make mention of determining whether a resource can have only one reference to it or more than one reference. This is not described. Therefore, there is no teaching or suggestion in Furlani of determining whether a relationship is a containment-based relationship, in which there is only one reference from instances of one resource to another resource, and using a chained locking strategy, if the relationship is determined to be a containment-based relationship.

Since both Goldstein and Furlani fail to describe, teach or suggest at least applicants' claimed element of determining whether a relationship between one resource and another resource is a containment-based relationship or a reference-based relationship, in which a containment-based relationship is defined as a relationship in which there is only one reference from instances of one resource to another resource, and a referenced-based relationship is defined as having more than one reference from instances of a resource to another resource, and then locking a resource using a chained locking strategy in response to the determining indicating that the relationship is a containment-based relationship, and locking the resource using a reference-based locking strategy in response to the determining indicating the relationship is a reference-based relationship, applicants respectfully submit that the combination also fails to describe, teach or suggest this aspect of applicants' claimed invention. Applicants respectfully submit that the mere mention of two types of locks or of

the term "reference" is not a teaching of what is claimed by applicants. Applicants respectfully submit that there is no teaching in either of the references or in the combination of determining the type of relationship among the resources, as defined in applicants' claimed invention, and then selecting a locking strategy based on that determination.

Based on the foregoing, applicants respectfully request an indication of allowability for independent claim 1. Further, the dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features. The other cited references do not overcome the deficiencies of Goldstein and Furlani, either alone or in combination.

As an example, applicants recite in dependent claim 49 that a resource includes a count of the number of references made to it. This is not described in any of the cited art, either alone or in combination.

For all of the above reasons, applicants respectfully request an indication of allowability for all pending claims.

Should the Examiner wish to discuss this case with applicants' attorney, please contact applicants' attorney at the below listed number.

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Respectfully submitted,

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Dated: February 15, 2008

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